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I. CYATHIFORMES. *Pileus submembranaceous, at length depressed, umbilicate or even infundibuliform.*

A. STIPE GLABROUS. 135-140.

B. STIPE VELVETY OR PRUINATE. 141-143.

II. CLAVIFORMES. *Pileus membranaceous, campanulate or convex, never depressed.*

A. STIPE GLABROUS. 144-145.

B. STIPE VELVETY OR PRUINATE. 146-148.

§ 4. PLEUROTUS. *PILEUS MORE OR LESS IRREGULAR; THE STIPE EXCENTRIC, LATERAL OR WANTING. COMMONLY GROWING ON WOOD.*

A. STIPE EXCENTRIC.

a. *Lamellae colored.* 149-151.

b. *Lamellae white.* 152-153.

B. STIPE LATERAL AND VERY SHORT.

a. *Lamellae colored.* 154-158.

b. *Lamellae white or pallid.* 159-162.

SYNOPSIS TO NORTH AMERICAN SPECIES OF HELIOMYCES.

HELIOMYCES LE'VILLE CHAMP. EXOT. AM. SC. NAT. 1844.

Pileus coriaceous- or membranaceous-tremellose, plicate-sulcate or rugulose. Stipe central, tough, cylindric, fistulose. Lamellae similar in substance to the pileus, the edge acute; spores white.

Small Agarics which are tremelloid when fresh and growing, and when dry have the appearance of Marasmii.

A. STIPE GLABROUS.

a. *Pileus colored from the first.* 1-2.

b. *Pileus at first white.* 3-4.

B. STIPE PRUINOSE. 5-6.

FIELD NOTES ON THE UREDINEAE.

A. O. GARRETT.

The following notes refer to collections of rusts made during the past three years at the head of Big Cottonwood Canyon, about thirty miles from Salt Lake City. The altitudes for the following species range from 8,500 to 9,500 feet.

PUCCINIA SCANDICA Johans. — On Aug. 13 the writer collected an aecidium on young plants of *Epilobium alpinum* which

was determined both by Sydow and Holway as the aecidial stage of *Puccinia epilobii-tetragoni* (DC.) Winter. On the same host but in a different locality *Puccinia scandica* Johans. was collected three days later—the first American collection of this species. The opinion was then formed that the aecidia previously collected were connected with *Puccinia scandica*; and collecting in the same locality the two succeeding seasons has strengthened this opinion for the following reasons: 1, I have never found teleutosori of *Puccinia epilobii-tetragoni* in this region, nor in any other at so high an altitude; 2. The aecidia reach their greatest abundance some time before the teleutospores of *P. scandica* appear; 3. Several specimens were obtained this past season in which both aecidia and teleutosori were found on the same plant, and even on the same leaf. The aecidia have, however, been collected upon hosts upon which the teleutosori of *P. scandica* have not yet been found.

PUCCINIA CARICIS-ASTERIS Arth. — Just about dark on August 11, 1905, a collection was made of the aecidia of this species on *Aster adscendens*. The following day another trip was made to the spot for the purpose of finding the teleutosori if possible. The *Aster* plants were growing among a profusion of *Carex festiva*. An *Aster* bearing defunct aecidia was soon found; and the surrounding *Carex* was well infected.

A few days later in another locality the aecidia were found on *Aster Fremonti* with abundant infection on the adjacent *Carex festiva*. A half mile or so away a collection had been made on July 11, of the aecidia on *Aster ciliomarginatus* Rydb. Inspection of the *Carex festiva* in this vicinity showed abundance of teleutosori.

AECIDIUM MONOICUM Peck. — A collection of this aecidium on *Arabis Drummondii* being made July 22, 1905, in a locality where there was a large number of the infected hosts, a return was made to the place on August 21 to search for the alternate form. A host plant bearing defunct aecidia was soon located, and the surrounding plants were carefully examined with the result that teleutosori were found on *Trisetum subspicatum*. The two host-plants were intimately associated in growth, and further examination revealed the fact that the *Trisetum* rust was found only on those plants that were immediately adjacent to infected *Arabis* plants. Specimens of the *Trisetum* rust have been sent to Dr. Arthur, and he believes it to be undescribed.

CAEOMA CONFLUENS (Pers.) Schroeter. — On July 3, 1905, a collection of this rust was made on *Ribes vallicola*. The host-plants grow along the banks of the mountain streams, and the lowermost willow branches frequently touch the *Ribes* bushes as they are swayed by the wind. A collection was made of a *Melampsora* on *Salix* in August, 1903, and again each of the following Augusts. It is the belief of the writer that these two

forms are connected for the following reasons: First, the two hosts are intimately associated in growth. Second, the appearance of the *Caeoma* antedates that of the *Melampsora*. Third, the *Melampsora* occurs on those willow branches low enough to brush against the *Ribes* bushes, or else to be easily infected by the wind. Fourth, during the latter part of the season of 1905, whenever an infected *Salix* was found, search was made for the *Ribes* bush and then for defunct aecidia, almost invariably with successful results. Fifth, the *Salix* goes to the mouth of the Canyon, but the *Ribes* accompany them less than half-way. When the *Ribes* stops, the *Melampsora* also stops.

NOTES FROM MYCOLOGICAL LITERATURE, XX.

W. A. KELLERMAN.

R. A. HARPER'S WORK ON SEXUAL REPRODUCTION and the Organization of the Nucleus in Certain Mildews is Publication No. 37 of the Carnegie Institution of Washington, pp. 1-104. Pl. I-VII, September 1905. Of this interesting and important investigation no brief summary can be made, but the author's conception as to alternation of generations in the higher fungi may be quoted in part. "In the rusts we have sexual reproduction by vegetative fertilization. The fusing cells are perhaps morphologically vegetative offshoots of an egg-cell. . . . In the Basidiomycetes by apogamy sexual cell fusion may have disappeared or we may have vegetative fertilization. . . . In the Ascomycetes we have sexual reproduction and alternation of generations, modified by the adaptation of the spore mother cell as an explosive organ for the dissemination of the spores and as a storage reservoir for the production of resting spores with a large supply of metaplasmic reserve products." . . .

C. L. SHEAR GIVES AN ACCOUNT OF SOME OUT-DOOR INOCULATIONS made in the Spring of 1902, under the title of *Peridermium cerebrum* Peck and *Cronartium quercuum* (Berk.), pp. 89-92, *Journal of Mycology*, Volume 12, May 1906. On May 1st aecidiospores of *Peridermium cerebrum* (from *Pinus virginiana*) were successfully applied to *Quercus coccinea*—uredo sori appearing May 12. Shirai has by inoculation proven the connection between *Cronartium gigantium* (Mayr) Tubeuf and what he calls *Cronartium quercuum* (Cooke) Miyabe. Mr. Shear is of the opinion that *Peridermium gigantium* (Mayr) Tubeuf is the same as *P. cerebrum* Peck described many years earlier.

THE NORTH AMERICAN SPECIES OF HELIOMYCES—6 in number—are grouped and diagnosed in the *Journal of Mycology* for